

**THE IDENTITY OF *CICADA TIBICEN* LINNÉ
[=*TIBICEN CHLOROMERUS* (WALKER, 1850)]
(HEMIPTERA: CICADOIDEA: CICADIDAE)¹**

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ABSTRACT: A lectotype is designated for *Cicada tibicen* Linné, 1758. The Linnaean specimen located in the Zoological Museum of Uppsala University can be traced to Linné and the original species description. The species is determined to be the same as what is currently recognized as *Tibicen chloromerus* (Walker, 1850), making *T. chloromerus* and *Cicada sayi* Smith and Grossbeck, 1907, junior synonyms of *Tibicen tibicen* (L.).

KEYWORDS: Hemiptera, Cicadoidea, Cicadidae, *Cicada tibicen*, *Tibicen chloromerus*

The name *Cicada tibicen* Linné, 1758, has been used for several different species from North and South America (see references in Metcalf 1963; Duffels and van der Laan 1985) since its original description in the 10th edition of *Systema Naturae* (Linné, 1758). The application of the name to several species on two continents can be traced back to both the brevity of Linné's description, and his reference to the historical drawing on plate 49 of Maria Sybille Merian's book (1705) on the insects of Surinam.

The original description of *Cicada tibicen* reads: "C. scutelli apice emarginato" (Linné 1758: 436). However, a notch in the cruciform elevation apex is an insufficient character to separate an individual species, as several cicada genera possess this character.

Linné identified the habitat as 'America.' The citation of Merian's (1705) plate has led authors to consider *Cicada tibicen* a South American species (Davis 1925; Metcalf 1963; China 1964; Duffels and van der Laan 1985) rather than a North American species. Uhler (1892) stated that the figure in Merian was more typical of *Fidicina mannifera* (Fabricius, 1803) and "represent [a] species very different from the true *C. tibicen*" based on comparisons made by Stål to material in the Fabricius collection and presumably to specimens in the Swedish Museum of Natural History, Stockholm. The Fabricius collection in Copenhagen contains a specimen identified as *Cicada tibicen* L. that belongs to *Tibicen lyricen* (De Geer, 1773). The Swedish Museum of Natural History contains specimens labeled *Cicada tibicen* that are currently recognized as *Tibicen chloromerus* (Walker). This all leads to the conclusion that North American taxonomists were using *C. tibicen* for a South American species while historical European taxonomists were consistently applying the name to North American species. In 1764, Linné significantly expanded his description of *Cicada tibicen* and included a statement that the species inhabits Carolina as well as Surinam. Thus Linné attributed the species specifically to North America as well as

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Surinam. One can consider, as a result, that the “America” Linné (1758) was addressing was North America as well as South America. In addition, Wallin (1992) states that the 1764 manuscript was already written in 1758 (see below).

The expanded species description of *Cicada tibicen* in Linné (1764) describes the color of various morphological features, including the infuscations of the fore wing. Many of these characters can be attributed to several of the *Tibicen* Latreille species inhabiting eastern North America. However, the description of the opercula separates *C. tibicen* from other related North American species: “Opercula sub abdomine ovato-oblonga, concava versus ventrem, viridia, tegentia and excipientia subtus maximam abdominis partem” (Linné 1764).

Linné describes here the opercula as ovate-oblong, concave in ventral direction, becoming green, concealing and taking up most of the under part of the abdomen (Fig. 1). No other North American species that has been attributed to *C. tibicen* has opercula shaped in this manner except *T. chloromerus*. Furthermore, this character cannot be applied to any known species of *Fidicina* Amyot



Fig. 1. A. *Cicada tibicen* specimen in the Linnaean collection of the Uppsala University Zoological Museum. The label is in Thunberg's handwriting and links the specimen to Linné. B. Ventral view of *Cicada tibicen* from the Linnaean collection illustrating large opercula described in Linné (1764).

and Serville or related genera from South America (Davis 1925; Metcalf 1963; China 1964; Duffels and van der Laan 1985).

The question remained whether Linné used either one or more cicada specimens or the figure in Merian (1705) to describe *C. tibicen*. It is clear now from Linne's 1764 description that he used the specimen in the Linnaean collection at Uppsala University as the basis for his 1764 description and not the figure in Merian (1705), since this figure does not match the coloration in Linné's 1764 description. The description provided by Merian does not mention the opercula or coloration (figure reprinted and text translated in Davis 1925), but the tegmina of the specimen in the plate show infuscation along and between all the wing crossveins (a character found in many *Fidicina* and *Fidicinoides* Boulard and Martinelli species) rather than the "spots" mentioned in Linné's 1764 description. There is also significant evidence that the 1758 description can be connected to the specimen in the Uppsala collection through the 1764 description.

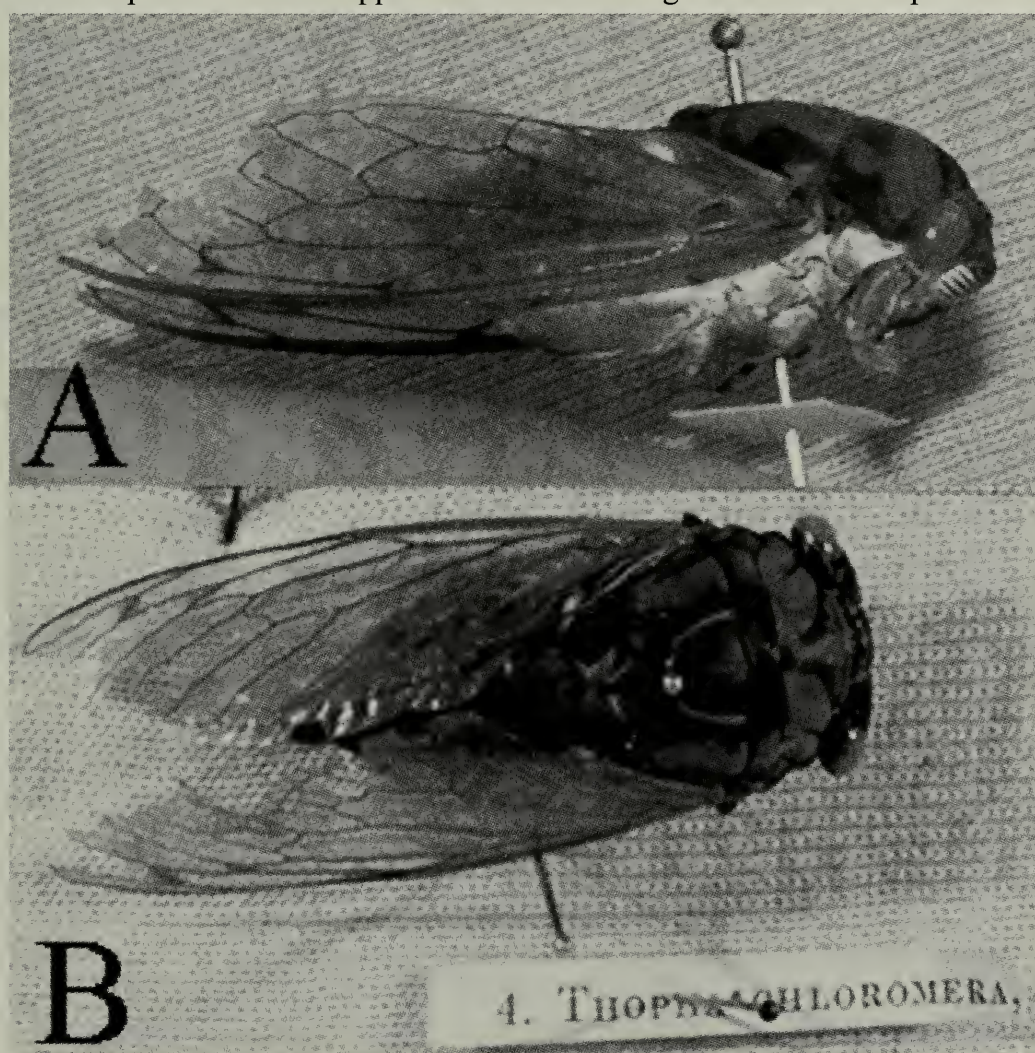


Fig. 2. A. Lateral view of *Cicada tibicen* from the Linnaean collection. The humpbacked shape of the prothorax and head is characteristic of the species. B. Holotype specimen of *Tibicen chloromerus* (Walker) from the Natural History Museum, London. The specimen is identical to the specimen of *Cicada tibicen* in the Linnaean collection.

Wallin (1992) describes how specimens from the 1764 catalogue can be tied to Linné and to descriptions in the 10th edition of *Systema Naturae* (Linné 1758). The label attached to the Uppsala specimen (Fig. 1) was written by Thunberg (a pupil of Linné) identifying it as *Cicada tibicen*, and the source of the specimen as a donation by the Museum Gustavo-Adolphianum (Gustav IV Adolf) as determined by Linné's inventories. The donation by King Gustav IV Adolf included the insects of his grandmother's (Queen Lovisa Ulrika) collection, which had been examined and curated by Linné. Thus, the specimen in the Linnaean collection at Uppsala University can be tied to Linné. Linné's publication of 1764 is a catalog of the specimens in the Queen's collection, but the manuscript was published many years after it was finished, and Linné referred to the manuscript in the 10th edition of *Systema Naturae* (Wallin 1992). The fact that the manuscript containing the 1764 description was already complete when the 10th edition of *Systema Naturae* was published, and the fact that the 1764 description matches specifically to the specimen currently in the collection in Uppsala and not to the drawing also cited in 1758 is compelling evidence that the specimen in the Linnaean collection is the specimen used by Linné to describe *Cicada tibicen* in 1758.

Although some Linnaean cicadas are housed in the collection of the Linnean Society in London (Fitton and Harman 2007; Webb 1979), no specimen matching Linné's description of *Cicada tibicen* could be found there. However, a review of the Linnaean specimens in the Zoological Museum of Uppsala University revealed a specimen that is most probably used by Linné for the description of *Cicada tibicen*. This specimen, bearing the labels: 'Uppsala Univ. Zool. Mus. / Linnésamlingen nr. 1838 / *Cicada tibicen*,' and a label 'Tibicen typus' (of unknown origin but not in the handwriting of Linné or Thunberg) is hereby designated the lectotype. As a consequence of this lectotype designation, *Tibicen tibicen* (Linnaeus, 1758) and the species currently recognized as *Tibicen chloromerus* (Walker, 1850) become synonyms. Figure 2 depicts the holotype of *Thopha chloromera* Walker, 1850 (= *Tibicen chloromerus* (Walker, 1850)), that is now a junior synonym of *Tibicen tibicen* (Linné, 1758). *Cicada sayi* Smith and Grossbeck, 1907, which is regarded as a junior synonym of *Tibicen chloromerus* is now also considered a junior synonym of *Tibicen tibicen* (L.).

Garman (1903) considered *C. tibicen* to be a valid taxon and figured a specimen that would be named *Cicada sayi* by Smith and Grossbeck (1907). Smith and Grossbeck (1907), Davis (1925) and China (1964) use *tibicen* as a valid taxon, as do the bibliographies of Metcalf (1963) and Duffels and van der Laan (1985), making Article 23.9.1.1 inapplicable. The author has been unable to identify 25 papers published by at least 10 authors in the past 50 years using *T. chloromerus* making Article 23.9.1.2 inapplicable as well. As a result, prevailing usage cannot be maintained as per Article 23.9.1, and a *nomen oblitum* and *nomen protectum* cannot be assigned to the taxa as per Article 23.9.2 (ICZN 1999). As a result, *Tibicen tibicen* (Linne, 1758) is the valid taxon based on the Principle of Priority (ICZN 1999).

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